

ABSTRACT

A pattern generating system for generating two-dimensional images on a surface includes a light source and one or more Zone Plate Modulator (ZPM) arrays. The ZPM arrays comprise diffractive zone plate modulating elements that are capable of either diffracting or reflecting an incident light according to the image data. ~~The diffracted light waves form an array of light spots on the primary focal plane of the ZPM array.~~ In a high-resolution pattern generating system, ZPM arrays are used as spot array generators. ~~The light spots in the spot array constitute the fundamental image pixels.~~ A complete high-resolution image is formed by scanning individual light spots in the spot array using a subfield scanning means. ~~In a direct pattern generating system, the ZPM elements in ZPM arrays are used directly as the fundamental image pixels and in conjunction with either a dark or a bright field optical imaging system. The surface is a display screen for viewing or a layer of photo-modifiable material of which one or more characteristics are to be modified by the light waves. Further, a two-dimensional image is generated by using an one-dimensional ZPM array in conjunction with a scanning means scanning in the direction normal to the one-dimensional ZPM array.~~